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# FACTOR ANALYSIS OF SOME PSYCHOMETRIC MEASURES OF IMPULSIVENESS AND ANXIETY[1]

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*Summary.*—Two orthogonal personality traits or predispositions, impulsiveness and anxiety, have been invariant in five separate factor analyses. One of these analyses is presented here along with an item analysis of the Barratt Impulsiveness Scale (BIS) which has a high loading on the impulsiveness factor. The BIS has never significantly correlated with any of the various anxiety or emotional stability measures in over 50 administrations of the scale, further evidence for the invariance of these two second-order factors.

A prime goal of psychometric research is to discover invariant relationships among measures of personality traits over as wide a range of *S*s as possible. Factor analysis has been used extensively for this purpose. This article will describe an invariant relationship between psychometric questionnaires which have had consistently high loadings on two orthogonal personality factors, impulsiveness and anxiety.

A questionnaire developed by Barratt (1959) has been administered over 50 times to widely varying groups of *S*s in the age range 14 to 50 yr. *S*s have included samples of high school students, undergraduate college students, medical students, adult church groups, and various civic groups. These same *S*s completed one or more of a variety of both standardized and experimental questionnaires including the Taylor Manifest Anxiety Scale (1953), the Guilford-Zimmerman Temperament Survey (1949), the Thurstone Temperament Schedule (1953), the 16 PF Questionnaire (Cattell, 1957), and the NSQ (Scheier & Cattell, 1961). The Barratt Impulsiveness Scale (BIS) *has never* significantly correlated in any of these studies with any anxiety or emotional stability scale. Also, in five separate factor analyses using different *S*s the relative relationship of the impulsiveness and anxiety measures has been orthogonal and invariant even though different marker variables were used in the different factor analyses.

Anxiety questionnaires have been related to a variety of behavioral measurements (Montague, 1953; Shephard & Abbey, 1958; Taylor, 1958; Haywood, 1961). The BIS has been related to a number of behavioral measurements including performance on verbal learning tasks (Henry, 1959), mirror tracing (Barratt, 1959), and risk taking (Kogan & Wallach, 1964), and simple tapping, visual jump reaction time, solving simple arithmetic problems, critical flicker fusion, and auditory reaction time (Barratt, 1963a). The BIS also has been related to intra-individual variability of autonomic nervous system measures (Barratt, 1963b).

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Barratt (1962, 1963a) has conjectured that impulsiveness as measured by the BIS is partially a function of central nervous system mechanisms, primarily the limbic system.

One of the 5 factor analyses of the impulsiveness and anxiety measures (mentioned above) is presented below along with a factor analysis of the BIS items.

## PROCEDURE

Eight psychometric scales and inventories were administered to 223 students enrolled in general psychology classes. The students ranged in age from 19 to 26 yr.; there were

TABLE 1

MEANS AND STANDARD DEVIATIONS FOR THE 30 TEST VARIABLES

| No. | Battery | Variable | *M* ± *SD* |
|---|---|---|---|
| 1 | | Taylor Manifest Anxiety Scale | 16.1 ± 7.53 |
| 2 | | Barratt Impulsiveness Scale I | 24.8 ± 5.71 |
| 3 | IPAT Anxiety Scale | Cattell Anxiety Covert (A) | 15.1 ± 5.07 |
| 4 | | Cattell Anxiety Overt (B) | 12.4 ± 6.29 |
| 5 | | Otis Intelligence Scale | 58.7 ± 8.68 |
| 6 | Barratt Impulsiveness Scale II | Lack of Persistence | 11.3 ± 4.97 |
| 7 | | Social Optimism | 9.7 ± 3.44 |
| 8 | | Lack of Motor Inhibition | 19.2 ± 5.17 |
| 9 | | Aggression-Autonomy | 11.3 ± 3.51 |
| 10 | | Action Oriented | 10.0 ± 3.52 |
| 11 | Guilford-Zimmerman Temperament Schedule | General Activity | 18.2 ± 5.51 |
| 12 | | Restraint | 15.1 ± 5.59 |
| 13 | | Ascendance | 16.0 ± 5.76 |
| 14 | | Emotional Stability | 17.7 ± 5.85 |
| 15 | | Objectivity | 18.4 ± 4.87 |
| 16 | Cattell 16 P. F. | A. Warm-Aloof | 8.6 ± 3.47 |
| 17 | | B. Bright-Dull | 8.0 ± 1.85 |
| 18 | | C. Calm-Emotional | 18.0 ± 3.53 |
| 19 | | E. Aggressive-Mild | 14.4 ± 4.10 |
| 20 | | F. Enthusiastic-Glum | 16.0 ± 4.20 |
| 21 | | G. Conscientious-Casual | 12.1 ± 3.15 |
| 22 | | H. Adventurous-Shy | 13.3 ± 5.20 |
| 23 | | I. Sensitive-Tough | 9.2 ± 3.91 |
| 24 | | O. Timid-Confident | 9.0 ± 3.57 |
| 25 | | $Q_3$. Controlled-Uncontrolled | 9.6 ± 2.93 |
| 26 | | $Q_4$. Excitable-Composed | 11.4 ± 4.60 |
| 27 | Thurstone Temperament Schedule | Active | 11.4 ± 3.22 |
| 28 | | Vigorous | 11.5 ± 4.69 |
| 29 | | Impulsive | 12.2 ± 3.28 |
| 30 | | Stable | 10.5 ± 3.92 |

126 males and 97 females. The psychometric inventories were: (1) Taylor Manifest Anxiety Scale (1953), (2) Barratt Impulsiveness Scale I (BIS-I; 1959), (3) The IPAT Anxiety Scale (Cattell, 1957), (4) Guilford-Zimmerman Temperament Survey (1949), (5) 16 PF Scale (Cattell, *et al.*, 1957), and (6) Barratt Impulsiveness Scale II. This last inventory is based on a study by Twain (1957) in which he isolated 5 sub-factors of impulsiveness. The 5 sub-factors in the BIS-II are: (a) lack of persistence, (b) social optimism, (c) lack of motor inhibition, (d) aggression-autonomy, (e) action oriented. The other two tests were the (7) Thurstone Temperament Schedule (1953) and the (8) Otis Quick Scoring Mental Ability Test, Gamma, Form Em.

Of the 50 separate scores available on these 8 psychometric inventories, 30 measures were selected for the factor analysis presented below. Those measures were selected which were defined as measures of impulsiveness or anxiety (emotional stability) by their authors; other measures were selected to help clarify the relationship between the two constructs. One of the risks involved in concentrating the measures on an *a priori* basis in favor of impulsiveness and anxiety is the possibility of distorting the relative significance of these two hypothetical constructs with regard to the total personality structure. However, since a large number of the personality measures used in this study were from factored personality batteries, their relationship to the total personality structure would be known and the above risk was not considered a serious problem. The primary goal was to note the relationship of impulsiveness and anxiety measures.

The 30 measures selected for the factor analysis did not show significant differences between *M*s and *SD*s for males and females with one exception—the "vigorousness" sub-test of the Thurstone Temperament Schedule. Males scored significantly higher than females on this sub-test. This sub-test was retained, however, to determine its relationship to the hypothesized anxiety factor. The Taylor Manifest Anxiety Scale has been described as a measure of "drive level" (Spence, 1958). Thurstone defined the vigorousness sub-test as a measure of "great expenditure of energy." Although drive level and actual expenditure of energy are not necessarily synonymous, the vigorousness sub-test was retained to check on its relationship to the anxiety factor.

For the factor analysis of the items of the BIS, that test was administered to 275 male high school students from an all-male Catholic high school. The intercorrelations of all 85 items of the BIS were factor analyzed, but only the factors and factor loadings for these items which are currently scored as part of the BIS are presented below.

## RESULTS

### *Factor Analysis of Anxiety and Impulsiveness Measures*

All of the measures of anxiety and emotional stability are highly intercorrelated as are the measures of impulsiveness (Table 2). However, none of the impulsiveness measures is significantly correlated with any of the anxiety measures.

A rotated varimax solution of the centroid factor matrix produced 6 orthogonal factors (Table 3). These factors were defined on the basis of an *a priori* analysis of the items on the scales having the highest loadings on each factor. Names often have little meaning in defining factors. An attempt was made here to be as descriptive as possible in line with the usual factor analytic nomenclature (French, 1953).

Factor I. *Impulsiveness;* like to take a chance, seek adventure; act without thinking; avoid work requiring patience and carefulness; have variable behavior patterns (e.g., change plans often, don't stay with a task). The BSI-I and Guilford's restraint scale had the highest loadings on this factor.

Factor II. *Anxiety;* nerves get on edge; tremble and perspire when thinking of difficult tasks; get over-excited and rattled. This is a typical general anxiety factor. Note that Variables 1, 3, 4, 14, 15, 18, 24, 26, and 30 have high loadings on the anxiety factor and low loadings on the impulsiveness factor without exception. Variable 8, lack of motor inhibition, has a high loading on both factors but in opposite directions.

Since the other four factors are not of primary interest here, the names and a brief description only will be presented: Factor III, dominance; leader, not shy; an organizer; Factor IV, femininity; lack of masculine interests and interested in feminine pursuits; Factor V, active; participate in sports, etc.; Factor VI, general intelligence. Although Factors V and VI are each defined by only two variables, they were included in this presentation because the 4 defining variables are well known psychometric scales whose loadings on these 2 factors are consistent with those of other factor studies.

This factor analysis was based on scores of college students. These results are typical, however, of the other 4 factor analyses obtained by the writer using other *S*s and other psychometric variables. In all 5 factor analyses, 2 orthogonal factors, anxiety and impulsiveness, were obtained with a clear simple structure configuration. Thus, it appears that this orthogonal relationship between anxiety and impulsiveness as measured by the above scales is relatively invariant.

### *Factor Analysis of BIS-5*[2] *Items*

Four orthogonal factors are involved in BIS-5 (Table 4). These factors are: I, speed of cognitive response; II, lack of impulse control; III, adventure seeking—extroversion; IV, risk taking. The *phi* coefficients in Table 4 were computed using the upper and lower 50% of *S*s for each item against the total score on the BIS.[3] Items were selected for BIS-5 if they had a factor loading of .30 or greater on 1 of the 4 factors or if they correlated .30 or higher with the total score and also had a factor loading of .25 or higher on one of the factors.

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[2] The various numbers after BIS refer to the key used to score the BIS. BIS-5 correlates +.86 with BIS-1 in the above study.

[3] If the *phi* coefficients had been computed using the upper and lower 26% of *S*s as done in selecting the original BIS items (Barratt, 1959), the *phi*s would probably have been higher.

## TABLE 2

INTERCORRELATIONS OF THE 30 TEST VARIABLES

| No. | Battery | Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Taylor Manifest Anxiety Scale | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | Barratt Impulsiveness Scale I | 009 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | IPAT Anxiety Scale | Cattell Anxiety Covert (A) | 540 | 228 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | Cattell Anxiety Overt (B) | 720 | 072 | 665 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | Otis Intelligence Scale | –232 | –099 | –092 | –268 | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Barratt Impulsiveness Scale II | Lack of Persistence | 148 | 457 | 220 | 219 | –200 | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | Social Optimism | –157 | 574 | 022 | –081 | –084 | 420 | | | | | | | | | | | | | | | | | | | | | |
| 8 | | Lack of Motor Inhibition | 310 | 482 | 447 | 380 | –103 | 286 | 376 | | | | | | | | | | | | | | | | | | | | |
| 9 | | Aggression-Autonomy | 111 | 299 | 222 | 105 | –009 | 273 | 274 | 418 | | | | | | | | | | | | | | | | | | | |
| 10 | | Action Oriented | –123 | 575 | 091 | –070 | –094 | 310 | 643 | 407 | 323 | | | | | | | | | | | | | | | | | | |
| 11 | Guilford-Zimmerman Temperament Schedule | General Activity | –239 | 392 | 099 | –265 | 051 | 163 | 351 | 116 | 116 | 468 | | | | | | | | | | | | | | | | | |
| 12 | | Restraint | 093 | –660 | –124 | –016 | 157 | –458 | –666 | –489 | –289 | –590 | –235 | | | | | | | | | | | | | | | | |
| 13 | | Ascendance | –385 | 207 | –265 | –391 | 052 | –078 | 290 | –015 | 332 | 317 | 387 | –202 | | | | | | | | | | | | | | | |
| 14 | | Emotional Stability | –684 | –159 | –614 | –662 | 174 | –213 | –021 | –490 | –227 | –040 | 201 | 100 | 339 | | | | | | | | | | | | | | |
| 15 | | Objectivity | –604 | –167 | –590 | –537 | 155 | –194 | –049 | –475 | –267 | –118 | 124 | 132 | 242 | 733 | | | | | | | | | | | | | |
| 16 | Cattell 16 P. F. | A. Warm-Aloof | –011 | 169 | –073 | –022 | –018 | 034 | 209 | 136 | 003 | 151 | 070 | –138 | 136 | –012 | –051 | | | | | | | | | | | | |
| 17 | | B. Bright-Dull | –098 | –064 | –067 | –106 | 337 | –099 | –084 | –053 | 073 | –031 | –010 | 051 | 087 | –067 | 035 | –028 | | | | | | | | | | | |
| 18 | | C. Calm-Emotional | –493 | –002 | –407 | –421 | 104 | –083 | 007 | –251 | –095 | 034 | 210 | –003 | 224 | 428 | 393 | –103 | 051 | | | | | | | | | | |
| 19 | | E. Aggressive-Mild | –313 | 292 | –051 | –304 | 054 | 070 | 312 | 115 | 371 | 421 | 408 | –292 | 578 | 108 | –003 | 040 | 155 | 105 | | | | | | | | | |
| 20 | | F. Enthusiastic-Glum | –124 | 625 | –028 | –153 | –068 | 276 | 632 | 412 | 285 | 617 | 404 | –594 | 342 | –005 | –053 | 240 | –053 | 052 | 402 | | | | | | | | |
| 21 | | G. Conscientious-Casual | –015 | –420 | –259 | –095 | –044 | –208 | –241 | –327 | –208 | –332 | –016 | 490 | 003 | 146 | 098 | –005 | –082 | 106 | –124 | –311 | | | | | | | |
| 22 | | H. Adventurous-Shy | –388 | 199 | –233 | –418 | –015 | –034 | 377 | –047 | 148 | 299 | 390 | –245 | 668 | 290 | 233 | 263 | 044 | 155 | 506 | 398 | 026 | | | | | | |
| 23 | | I. Sensitive-Tough | 194 | 040 | 109 | 164 | 027 | 009 | –032 | 031 | –195 | –059 | –160 | 057 | –146 | –140 | –145 | 232 | –047 | –295 | –140 | –008 | –100 | 053 | | | | | |
| 24 | | O. Timid-Confident | 530 | 142 | 537 | 625 | –161 | 248 | 047 | 402 | 045 | –028 | –169 | –080 | –314 | –589 | –509 | 117 | –058 | –406 | –151 | 018 | –106 | –224 | 205 | | | | |
| 25 | | $Q_3$. Controlled-Uncontrolled | –272 | –357 | –369 | –385 | 045 | –339 | –188 | –364 | –238 | –155 | 018 | 327 | 076 | 321 | 336 | –111 | 045 | 165 | –045 | –214 | 254 | 093 | –073 | –343 | | | |
| 26 | | $Q_4$. Excitable-Composed | 640 | 136 | 584 | 679 | –141 | 212 | –094 | 454 | 319 | 004 | –119 | –058 | –205 | –688 | –595 | –018 | –063 | –476 | –105 | –035 | –165 | –323 | 089 | 586 | –416 | | |
| 27 | Thurstone Temperament Schedule | Active | –108 | 396 | 085 | –075 | 125 | 180 | 343 | 227 | 139 | 486 | 621 | –292 | 303 | 033 | 026 | 175 | –003 | 052 | 317 | 376 | –092 | 292 | –017 | –040 | –165 | 008 | |
| 28 | | Vigorous | –295 | 204 | –151 | –240 | 007 | 103 | 205 | –006 | 235 | 319 | 330 | –198 | 317 | 198 | 156 | –262 | 054 | 259 | 308 | 239 | –064 | 124 | –415 | –218 | 067 | –105 | 198 |
| 29 | | Impulsive | –336 | 562 | –115 | –276 | –050 | 249 | 622 | 206 | 183 | 588 | 554 | –460 | 391 | 247 | 136 | 173 | –109 | 229 | 384 | 569 | –118 | 373 | –139 | –089 | –051 | –234 | 409 |
| 30 | | Stable | –615 | –023 | –511 | –560 | 127 | –128 | 071 | –349 | –185 | 067 | 266 | 023 | 299 | 637 | 521 | 014 | 121 | 441 | 238 | 029 | 078 | 283 | –141 | –472 | 270 | –548 | 058 |

TABLE 3

ORTHOGONAL ROTATED VARIMAX SOLUTION*

| Battery | Variable | Factor I | II | III | IV | V | VI | $h^2$ |
|---|---|---|---|---|---|---|---|---|
| | Taylor Manifest Anxiety Scale | −11 | −78 | −17 | 08 | −06 | −17 | 69 |
| | Barratt Impulsiveness Scale I | 77 | −12 | 09 | 03 | 27 | −04 | 70 |
| iety Scale | Cattell Anxiety Covert (A) | 15 | −75 | −14 | 00 | 09 | 06 | 61 |
| | Cattell Anxiety Overt (B) | 02 | −78 | −34 | 05 | 03 | −16 | 75 |
| | Otis Intelligence Scale | −10 | 17 | 03 | 01 | 04 | 52 | 32 |
| pulsiveness Scale II | Lack of Persistence | 51 | −22 | −13 | −06 | 16 | −11 | 37 |
| | Social Optimism | 74 | 07 | 28 | 02 | 08 | −19 | 67 |
| | Lack of Motor Inhibition | 53 | −51 | 11 | 00 | −03 | −02 | 55 |
| | Aggression-Autonomy | 34 | −32 | 37 | −30 | −04 | 17 | 47 |
| | Action Oriented | 67 | −01 | 33 | −10 | 23 | −08 | 63 |
| immerman Tempera- hedule | General Activity | 24 | 18 | 33 | −15 | 64 | −06 | 64 |
| | Restraint | −86 | 04 | −11 | 02 | 03 | 01 | 75 |
| | Ascendance | 14 | 27 | 70 | −07 | 21 | 06 | 64 |
| | Emotional Stability | −09 | 84 | 04 | 00 | 15 | 06 | 74 |
| | Objectivity | −11 | 77 | −06 | −01 | 11 | 07 | 62 |
| P. F. | A. Warm-Aloof | 17 | 03 | 18 | 48 | 03 | −10 | 31 |
| | B. Bright-Dull | −04 | 07 | 08 | −04 | −03 | 52 | 28 |
| | C. Calm-Emotional | 04 | 56 | −02 | −29 | 06 | 01 | 40 |
| | E. Aggressive-Mild | 27 | 10 | 60 | −12 | 22 | 19 | 54 |
| | F. Enthusiastic-Glum | 69 | 05 | 37 | 06 | 12 | −12 | 65 |
| | G. Conscientious-Casual | −51 | 15 | 05 | −05 | 05 | −26 | 36 |
| | H. Adventurous-Shy | 19 | 31 | 67 | 24 | 16 | −01 | 66 |
| | I. Sensitive-Tough | −02 | −15 | −06 | 59 | −02 | 04 | 38 |
| | O. Timid-Confident | 12 | −65 | −20 | 23 | 05 | −10 | 55 |
| | $Q_3$. Controlled-Uncontrolled | −38 | 40 | 13 | −08 | −12 | −10 | 35 |
| | $Q_4$. Excitable-Composed | 04 | −83 | −08 | −03 | 07 | 03 | 70 |
| Temperament | Active | 31 | −01 | 26 | −01 | 59 | 08 | 52 |
| | Vigorous | 21 | 21 | 18 | −59 | 19 | −03 | 50 |
| | Impulsive | 57 | 30 | 24 | −10 | 38 | −25 | 69 |
| | Stable | 02 | 72 | 04 | −03 | 19 | 09 | 56 |

wo decimal places.

TABLE 4

ROTATED VARIMAX SOLUTION OF BIS-5 ITEMS

| No. | Item | Item Factors I | II | III | IV | Item Scored | $\phi$ With Total Score |
|---|---|---|---|---|---|---|---|
| 4 | In the morning I usually bound out of bed energetically. | 20 | 34 | 01 | −08 | T | 15 |
| 9 | I usually think before I act. | −20 | 37 | 01 | −06 | F | 42 |
| 20 | I make up my mind quickly. | 89 | −03 | −03 | −05 | T | −37 |
| 57 | I make up my mind easily. | 86 | 02 | −02 | 01 | T | −27 |
| 75 | I like to do things on the spur of the moment. | 27 | −09 | 05 | 26 | T | −36 |
| 10 | I like mathematics. | 01 | 30 | 00 | 09 | F | 28 |
| 13 | I like to work crossword puzzles. | 06 | 30 | 24 | 02 | F | 13 |
| 14 | I like classical music. | 03 | 30 | −06 | 05 | F | 24 |
| 17 | I like detailed work. | −01 | 77 | 01 | −01 | F | 30 |
| 24 | I like to solve complex problems. | 15 | 54 | −01 | 28 | F | 26 |
| 27 | I consider myself always careful. | 03 | 29 | −03 | −05 | F | 31 |
| 38 | I don't like to wait for traffic lights to change. | −02 | −34 | −04 | 11 | T | −26 |
| 43 | I like work requiring patience and carefulness. | 03 | 84 | −08 | 02 | F | 39 |
| 48 | I easily become impatient with people. | −08 | −45 | −03 | 15 | T | −30 |
| 68 | It is easy for me to concentrate on my work. | 01 | 51 | 15 | 04 | F | 31 |
| 72 | My interests tend to change quickly. | 01 | −40 | −05 | 03 | T | −36 |
| 3 | I like to take a chance just for the excitement. | 07 | −05 | 24 | 67 | T | −30 |
| 46 | I like work involving competition. | 14 | 13 | 31 | 06 | T | −19 |
| 51 | In watching games, I often yell along with the others. | 11 | 00 | 41 | 05 | T | −20 |
| 54 | I don't like to eat outdoors. | −04 | −08 | −34 | 05 | F | 18 |
| 55 | I don't enjoy meeting relatives at family reunions. | −09 | −17 | −30 | 10 | F | −10 |
| 63 | I like work that has lots of excitement. | 07 | 06 | 48 | 38 | T | −23 |
| 78 | My friends consider me to be happy-go-lucky. | 15 | −13 | 36 | 03 | T | −41 |
| 84 | I like being where there is something going on all the time. | 04 | −07 | 74 | −11 | T | −16 |
| 21 | As a youngster I rarely took part in risky stunts. | −17 | 13 | −08 | −54 | F | 35 |
| 39 | I frequently feel on top of the world. | 14 | −03 | 10 | 38 | T | −24 |

*Note.*—Factors are I, Speed of cognitive response; II, Impulsiveness (lack of impulse control); III, Adventure seeking (extroversion); and IV, Risk taking. There are 26 items — 14+; 12−. BIS-5 and BIS-1 correlate .86.

## DISCUSSION

O'Connor, *et al.* (1956) found that the items on the Taylor Manifest Anxiety Scale (MAS) involved at least 5 factors. Twain (1957) reported 5 factors in a factor analysis of impulsivity. The BIS has been shown above to involve at least 4 factors. It is fairly obvious that the 2 orthogonal factors of impulsiveness and anxiety above are second-order factors since the MAS has a high loading on the anxiety factor and the BIS a high loading on the impulsiveness factor. What, then, does this invariant relationship between these 2 factors mean within behavior or personality theory?

Within the framework of learning theory, the MAS has been considered by Spence and his colleagues as a measure of drive level (1958). But Hull discussed in his 1943 *Principles* the oscillation of behavior as well as the drive level concept. Spence refers to oscillation of behavior as follows: "The (next) intervening variable *I* refers to the construct that Hull termed oscillatory inhibition and which he designated by the letter *O*. The basis for postulating this concept is the well-known observation that the behavior of organisms is highly variable. Even though learned, long established responses exhibit an oscillation from trial to trial in spite of the precautions of the experimenter to control all of the known determining variables" (1956). The BIS has been shown to relate significantly to intra-individual variability of both ANS measures and performance on a variety of laboratory tasks (Barratt, 1963). The writer suggests that the impulsivity factor is in part a measure of oscillation of behavior and, further, that oscillation of behavior partially has a basis in specific CNS centers (Barratt, 1962).

In discussing dimensions of personality, Guilford (1959) noted that impulsiveness is probably a separate factor from restraint, but that the two are probably correlated. The writer takes the position that restraint and impulsiveness are the opposite poles of the same bipolar dimension. The Guilford-Zimmerman restraint scale has a high negative loading on the above impulsiveness factor.

London and Rosenhan (1964) observed that "delay of gratification can be considered an explanation in search of a phenomenon. Since Dewey and Freud, impulse control or delay of gratification has been invoked as a critical explanatory concept for the development of the socialized self, and its absence as an explanation of psychopathy, delinquency, and such." The writer suggests that the invariant second-order factor of impulsiveness presented in this study is a basic element in the phenomenon needed for this explanation.

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